

Statistics

Lecture 2



Feb 19-8:47 AM

what is statistics?

SG 2

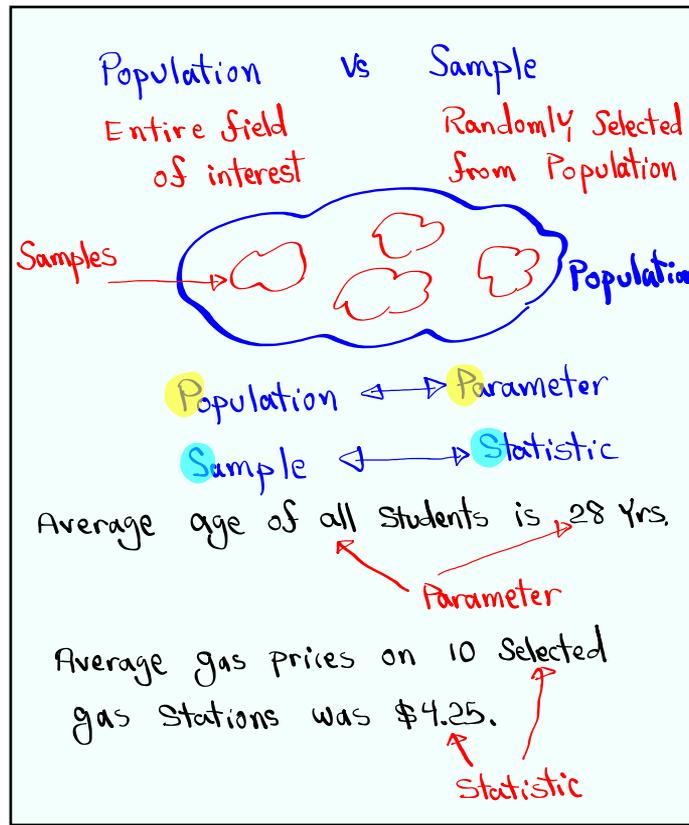
It is about collecting information (Data),
organize them, graph them, make
calculations and draw conclusion from
them with some level of confidence.

Two Branches

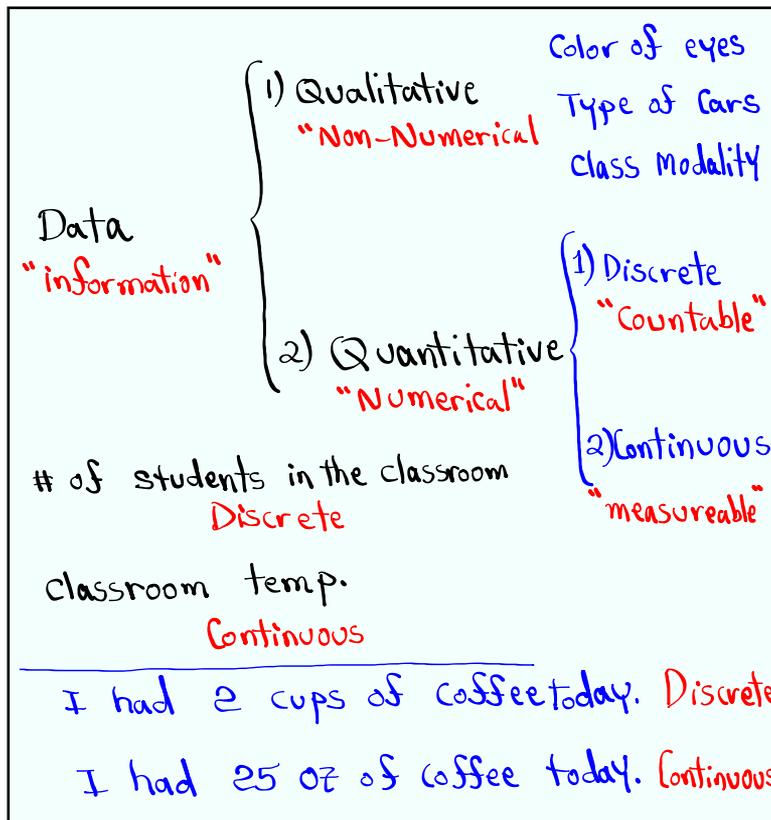
1) Descriptive working with data

2) Inferential making conclusion
and prediction

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Level of measurements:

- 1) **Nominal** Red, white, Blue
Toyota, Nissan, Honda, Ford
- 2) **Ordinal** Small, Med., Large
Box labels
A B C D ...
Zipcodes
- 3) **Ratio** Small (10oz) Large (20oz)
- 4) **Interval** Range of values
90% - 100% → A
5oz - 9.9oz → \$3 Stamp

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Methods on Collecting data

- 1) **Systematic** Every k th item is Selected.
every 5th caller Selected
for survey.
- 2) **Stratified** Divide into groups,
Select few from each
group.
Males (Select 4 males)
Females (Select 6 Females)

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3) cluster Divide into groups,
Select few groups,
Collect data from all members
of Selected groups.

College offers 2000 Sections of classes.
we Select 100 of these Sections,
and we ask all students to do
a Survey.

4) Random or Convenience
"Least Reliable Method"

You took this class because your
friend suggested.

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Observation

vs

Experiment

when we notice
changes due to
no action or
plan to modify

You take action
to modify and
observe possible
changes.

Slk 23 ✓

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Given Max = 100 , Min = 40
 find

- 1) $\text{Max} - \text{Min} = 100 - 40 = \boxed{60}$
 1) 60
- 2) $\frac{\text{Max} + \text{Min}}{2} = \frac{100 + 40}{2} = \frac{140}{2} = \boxed{70}$
 2) 70
- 3) $\frac{\text{Max} - \text{Min}}{4} = \frac{60}{4} = \boxed{15}$
 3) 15
- 4) $\frac{(\text{Max} - \text{Min})^2}{12} = \frac{60^2}{12} = \frac{3600}{12} = \boxed{300}$
 $\frac{(100 - 40)^2}{12} = \frac{(100 - 40)(100 - 40)}{12} = \frac{60 \cdot 60}{12} = \frac{3600}{12}$
 4) 300

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I randomly selected 20 students, here are the ages

18 19 20 23 24 25 25 25 28 29 30 32 35 35 38 40 42 45 48

- 1) Sample Size $n = \boxed{20}$
- 2) Min = 18, Max = 48
- 3) Range = Max - Min = 48 - 18 = $\boxed{30}$
- 4) Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{48 + 18}{2} = \frac{66}{2} = \boxed{33}$
- 5) Mode (value that repeated the most) = $\boxed{25}$

I wish to organize this sample in a table with 3 classes.
 ↳ frequency table.
 we must find class width.

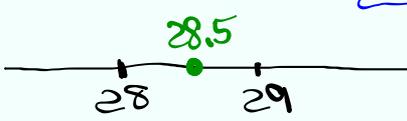
class width = $\frac{\text{Range}}{\# \text{ of classes}}$ if decimal → Round up
 if whole # → Add 1

CW = $\frac{\text{Range}}{3} = \frac{30}{3} = 10$ $\boxed{\text{CW} = 11}$

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freq. table

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
18 - 28	17.5 - 28.5	23	10	10	.50	50%
29 - 39	28.5 - 39.5	34	6	16	.30	30%
40 - 50	39.5 - 50.5	45	4	20	.20	20%

$$\text{class MP} = \frac{\text{+ class limits}}{2}$$


$$\text{Rel. F} = \frac{f}{n} = \frac{f}{20}$$
 Sample Size

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I randomly selected 25 exams. Here are the scores:

50 52 58 62 65
 68 68 70 73 75
 75 75 78 80 83
 85 88 88 88 90
 92 95 96 100 100

1) $n = 25$

2) Min = 50 Max = 100

3) Range = Max - Min
 $= 50$

4) Midrange
 $= \frac{\text{Max} + \text{Min}}{2}$
 $= \frac{100 + 50}{2}$
 $= \frac{150}{2} = 75$

5) Mode
 88 & 75
 Bimodal

6) Make a freq. table with 4 classes.

$$CW = \frac{\text{Range}}{4} = \frac{50}{4} = 12.5$$

$$CW = 13$$

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class limits	class BNDs	class mp	class F	Cum. F	Rel. F	% F
50 - 62	49.5 - 62.5	56	4	4	.16	16%
63 - 75	62.5 - 75.5	69	8	12	.32	32%
76 - 88	75.5 - 88.5	82	7	19	.28	28%
89 - 101	88.5 - 101.5	95	6	25	.24	24%

$$\text{class mp} = \frac{\text{+ class limits}}{2}$$

$$\text{Rel. F} = \frac{f}{n}$$

$$= \frac{f}{25}$$

$$\begin{array}{c} 62 \quad 62.5 \quad 63 \\ \hline \cdot \quad \cdot \quad \cdot \end{array}$$

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